

REMARKS

This is in response to the Office Action dated April 3, 2001. In view of the foregoing amendments and following representations, reconsideration is respectfully requested.

Initially, on page 2 of the Office Action, claims 16-17 are rejected under 35 U.S.C. 112, second paragraph. In the previous response, applicants asserted that one of ordinary skill in the art would understand what is being claimed in claim 16, as evidenced by U.S. Patent No. 5,400,497 (submitted with the previous response). It was noted that the inquiry to be made in determining whether a claim is definite under 35 U.S.C. 112, second paragraph, is whether those of ordinary skill in the art would understand what is being claimed. Amgen Inc. v. Chugai Pharmaceutical, Ltd., 18 USPQ2d 1016, 1030 (Fed. Cir. 1991).

In the Final Office Action the Examiner did not address these arguments or explain why one of ordinary skill in the art would not understand what is being claimed in claim 16 despite the demonstrated knowledge in the relevant art.

In view of the above, the Examiner is requested to withdraw the rejection of claim 16 under 35 U.S.C. 112, second paragraph.

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Next, in the Examiner's "**Response to Arguments**" (page 5 of the Office Action), the drawings are again objected to because the several features are allegedly not shown. However, as submitted in the previous response, the allegedly omitted features are

schematically illustrated in Fig. 1 of the present application. In particular, as described on page 15, line 21 to page 16, line 9:

- a) the component supply means 12 includes parts cassettes provided with reels 13;
- b) a component supply table 28B is mounted with stick-shaped component supply means 38 at which components are stored in a pipe member;
- c) a component supply table 28C on which bulk components 39 are placed; and
- d) a tray-shaped component supply table 28D.

It is noted that 37 CFR 1.83(a) specifies that:

“conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., a labeled rectangular box).” (Emphasis added)

Accordingly, it is submitted that each of the claimed features is adequately illustrated in the drawings. See MPEP section 608.02(d). Clearly, a detailed illustration of the above-mentioned features is not essential for a proper understanding of the invention as each of the various supply devices are known in the prior art. Again the Examiner is referred to U.S. Patent No. 5,400,497, which shows the various supply devices. As indicated in the previous response, Fig. 14 shows a parts supply device of a bulk cassette type, Fig. 15 shows a parts supply device of a stick-type, Fig. 16 shows a parts supply device of a tray type, and Fig. 17 shows a parts cassette which includes a reel. In view of the above, the Examiner is respectfully requested to withdraw the objection to the drawings.

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Next, on pages 2-3 of the Office Action, claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baker (U.S. Patent No. 5,323,528) in view of Asai et al. (U.S. Patent No. 5,711,065) and further in view of Mori et al. (U.S. Patent No. 5,456,001). Also, on page 4-5 of the Office Action, claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baker (U.S. Patent No. 5,323,528) in view of Asai et al. (U.S. Patent No. 5,711,065) and further in view of Onodera (U.S. Patent No. 5,741,114).

It is submitted that the present invention, as embodied by claims 15-18, clearly distinguishes over the collective teachings of Baker, Asai, Mori and Onodera for the following reasons.

To clearly distinguish over the applied prior art references, claims 15 and 18 have been amended and new claims 19-20 have been added. A copy of the amended portion of the claims with changes marked therein is attached and entitled "Version with Markings to Show Changes Made."

In the present invention, components are supplied at the component supply means and are mounted onto the board by the two mounting heads. With the arrangement claimed in claims 15 and 18, components supplied from one of the component supply tables can be mounted onto a board by the first mounting head, while the components supplied from the other of the component supply means are mounted onto the board by the second mounting head. However, in the event of a component shortage at either one of the component supply tables, components can be continue to be supplied from the

remaining component supply table and mounted onto the board by the corresponding mounting head. Thus, components can be replenished without the necessity of stopping the component mounting operation.

In the present invention, since the component supply table arranged on one side can be integrally replaced with a new component supply table, the replacement work can be simply, quickly, and safely performed through easy positioning.

Specifically, as shown in Figs. A-C of Exhibit I (attached hereto), each of the component supply tables is a component supply table 28A provided with component supply means comprised of parts cassettes provided with reels. As shown in Fig. B, one of the component supply tables 28A-1 has no required components and has all of the parts cassettes arranged on one side, while the new component supply table 28A-2 has the required components. In a replacement of the component supply table 28A-1 with new component supply table 28A-2, the lower head 31-2 continues to move for the purpose of mounting components on the board 37 while the upper head 31-1 is stopped (see Fig. B), thereby effectively accomplishing the necessary replacement. This is specifically set forth in new dependent claim 19.

Further, as shown in Figs. D-E of Exhibit II, when the components are mounted on a plurality of types of boards, for example, 37-1 and 37-2, one of the component supply tables 28A-1, having components required for one of the types of boards 37-1, is used for one type of board 37-1 while the other component supply table 28A-3, having components required for the other type of board 37-2, is used for the other type of board 37-2.

Note, if only one of the plural parts cassettes on one side is replaced for a new one, it is difficult to perform the replacement operation because the parts cassette must be removed from and inserted into a small space between adjacent parts cassettes which makes the positioning of the one parts cassette difficult and quite dangerous. Further, if a plurality of the parts cassettes, located on one side, are to be replaced with new ones, the removing and inserting operations must be performed for each parts cassette, thus requiring a long period of time for performing the replacement. Furthermore, when the components are to be mounted on a plurality of types of boards, in some cases, many parts cassettes at one side must be replaced with new ones, thus taking a longer time for replacement. In addition to the above, the parts cassette tends to become shifted or bent, which makes the insertion of a new cassette rather difficult. On the other hand, in accordance with the component mounting apparatus of the present invention, when the entire component supply table, which includes all of the parts cassettes arranged on one side, is replaced with a new component supply table, the above issues are eliminated.

Clearly, the cited references fail to teach or suggest such a replacement of the component supply table. In particular, **Baker** discloses a component placement machine, which requires that, when a component shortage occurs at any one of the cassettes, the placement machine must be stopped in order to permit the depleted cassette to be exchanged with a new cassette. That is, a continuous mounting operation cannot be carried out in the event of a component shortage.

Mori merely discloses an exchange of cassettes, but fails to disclose or suggest a component supply table having components that can be replaced without adversely affecting the component suction and mounting operations.

Asai merely discloses the use of a single head. **Asai**, however, fails to disclose or suggest that a component supply table can be replaced without any negatively influencing the component suction and mounting operations. Although **Asai** teaches that four carts 294, arranged on one side, can be moved on four casters 296 and that one of the four carts 294 can be removed and a new cart inserted, the adjacent carts may become shifted or bent, thus making it difficult to perform the replacement operation.

Onodera is cited by the Examiner to teach a pair of inverted U-shaped support frames. **Onodera**, however, does not disclose or suggest a component mounting apparatus that would permit replacement of a parts cassettes as in the component mounting apparatus defined in claims 15 and 18 of the present invention.

Accordingly, it is submitted that the collective teachings of **Baker**, **Mori**, **Asai** and **Onodera** do not disclose or suggest the present invention, as defined in claims 15 and 18.

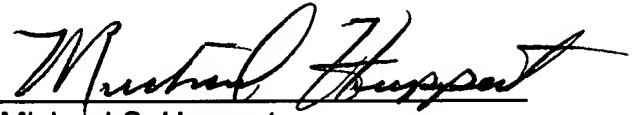
In view of the above, it is submitted that the present application is now clearly in condition for allowance. The Examiner therefore is requested to enter the above amendment and pass this case to issue.

In the event that the Examiner has any comments or suggestions of a nature necessary to place this case in condition for allowance, then the Examiner is requested

to contact Applicant's undersigned attorney by telephone to promptly resolve any remaining matters.

Respectfully submitted,

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15. (Twice Amended) A component mounting apparatus comprising:

a pair of component supply tables for accommodating a plurality of components, said component supply tables being arranged on opposite sides of a board mounting position, said component supply tables being supported on casters so as to be

movable between support frames from the opposite sides of the board mounting position and replaceable by moving one of the component supply tables, which is arranged on one of the sides from the one side of the board mounting position, and thereafter fixedly installing a new component supply table for accommodating a plurality of components [the component supply tables are fixedly installed] in a specified position[s] of the one side so as to replace the one component supply table with the new component supply table; and

a first mounting head section for successively picking up the plurality of components at one of the component supply tables, thereafter moving to a board positioned at the board mounting position, and thereafter successively mounting the plurality of picked-up components onto the board while moving in first and second directions which are perpendicular to each other,

wherein the first direction is perpendicular to a board transfer direction in which the board is transferred, and the second direction is located along the board transfer direction,

a second mounting head section for successively picking up the plurality of components at the other of the component supply tables, thereafter moving to the board positioned at the board mounting position, and thereafter successively mounting the plurality of picked-up components onto the board while moving in third and fourth directions which are perpendicular to each other,

wherein the third direction is parallel to the first direction, and the fourth direction is parallel to the second direction but is not necessarily the same direction as the second direction,

wherein each of the first and second mounting head sections is independently movable between the component supply table and the board, and one of the first and second mounting head sections is movable between the other of the component supply tables and the board while the other of the first and second mounting head sections is stopped for the replacement of one of the component supply tables with the new component supply table.

16. The component mounting apparatus according to claim 15, wherein each of the component supply tables is selected from one of:

a component supply table provided with component supply means comprises of parts cassettes provided with reels;

a component supply table mounted with a stick-shaped component supply means at which components stored in a pipe member are successively fed to a take-out position;

a component supply table on which bulk components are placed; and

a tray-shaped component supply table.

17. The component mounting apparatus according to claim 16, wherein component take-out positions of the component supply tables are positioned in a straight line extending along a board transfer path where the board is transferred.

18. A component mounting apparatus comprising:

a base structure;

a pair of inverted U-shaped support frames positioned on said base structure in a parallel relationship and on opposite sides of a board mounting position, wherein a board transfer path extends through openings in said U-shaped support frames;

a pair of component supply tables removably secured between said support frames on opposite sides of the board transfer path, each of said component supply tables accommodating a plurality of components,

wherein each of said component supply tables includes a plurality of casters for allowing the component supply tables to be moved in a perpendicular direction toward and away from the board transfer path;

a first mounting head section for successively picking up a plurality of components at one of the component supply tables, thereafter moving to a board positioned at the board mounting position, and thereafter successively mounting the [plural] plurality of picked-up components onto the board while moving in first and second perpendicular directions, wherein the first direction is perpendicular to the board transfer direction,

a second mounting head section for successively picking up a plurality of components at the other of the component supply tables, thereafter moving to the board positioned at the board mounting position, and thereafter successively mounting the plurality of picked-up components onto the board while moving in third and fourth directions which are perpendicular to each other, wherein the third direction is parallel to the first direction,

wherein each of the first and second mounting head sections is independently movable between the component supply tables and the board,

wherein the second mounting head section is movable between the other component supply table and the board while the first mounting head section is stopped for the purpose of replacing the one component supply table with the new component supply table.

EXHIBIT I

Fig. A

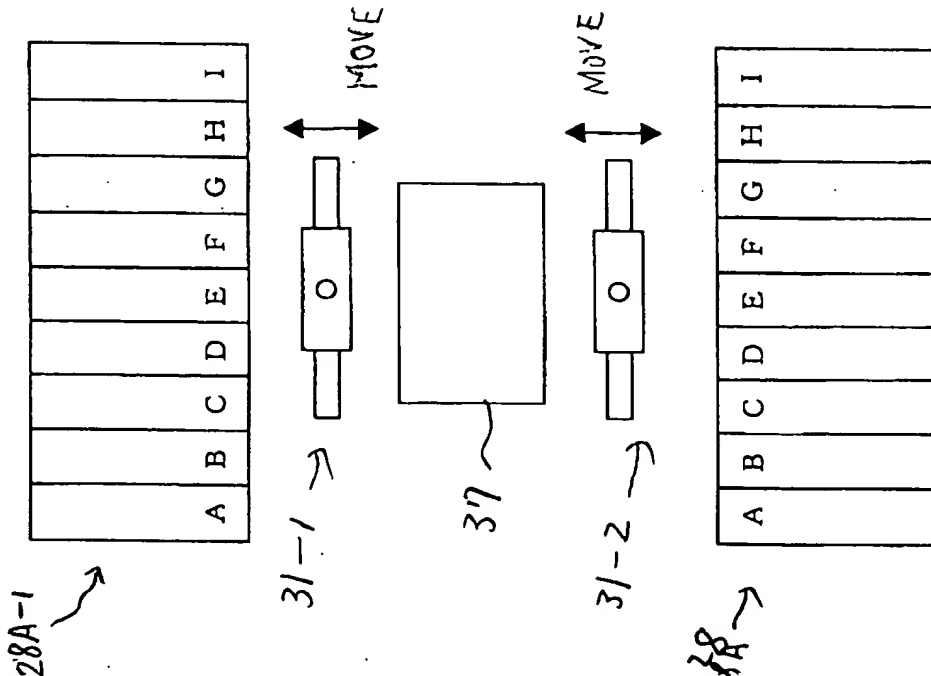


Fig. B

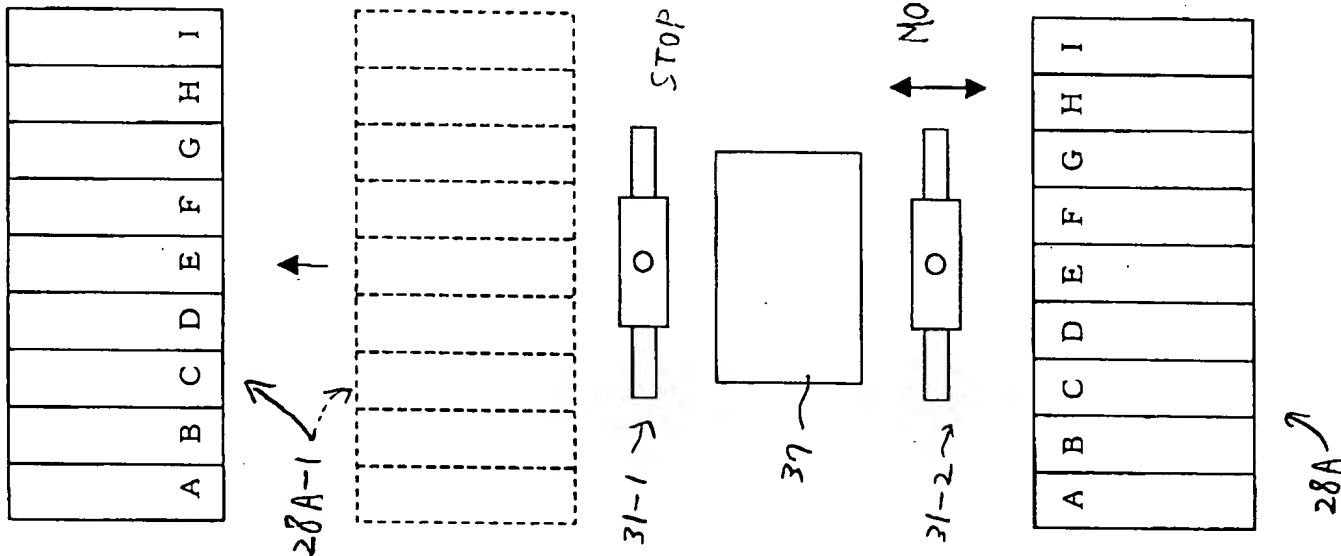


Fig. C

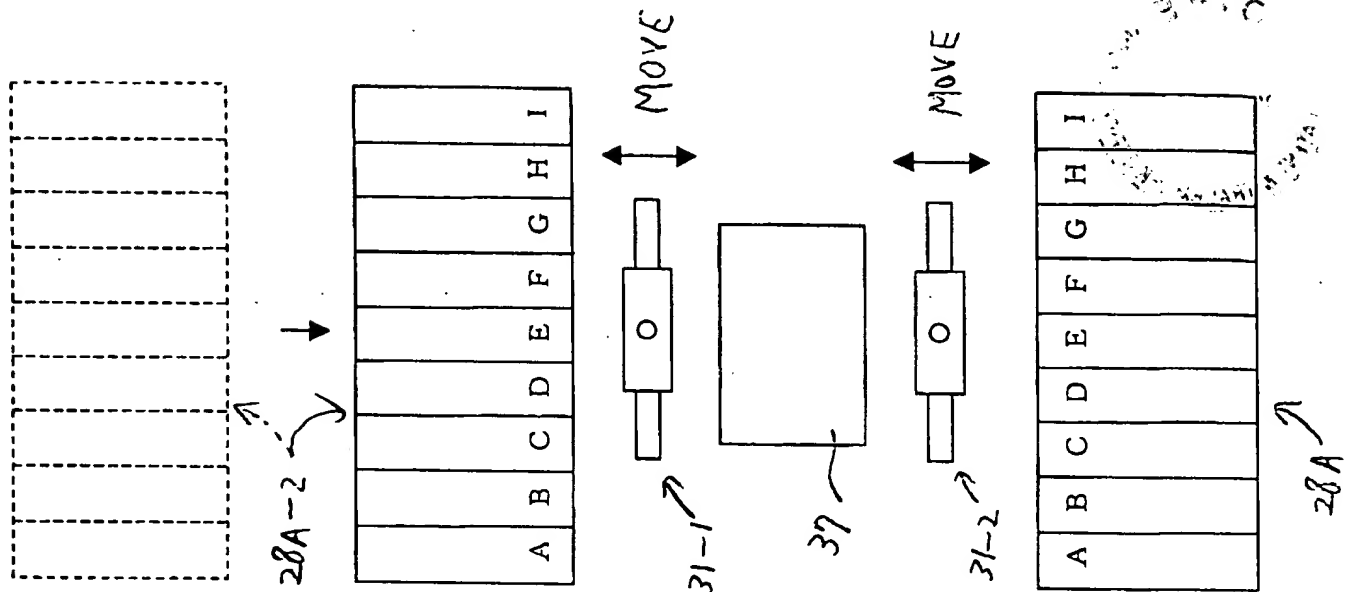


EXHIBIT II

Fig. D

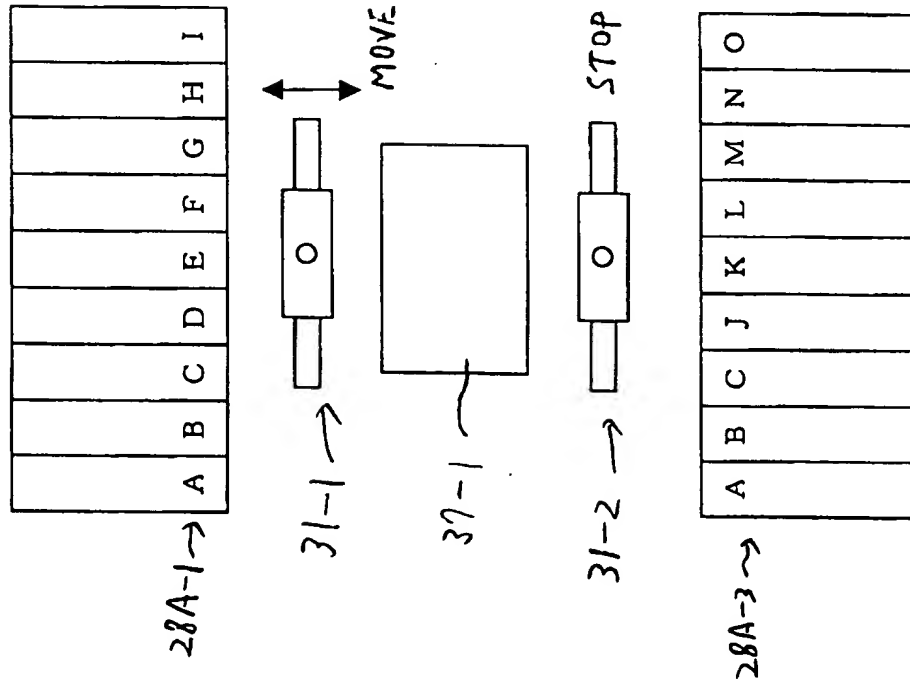


Fig. E

